

Inexpensive, Rugged and Compact Tunable Laser with Simple Tuning Control for Airborne Fiber Optic Sensor (FOS) Interrogators, Phase II

Completed Technology Project (2017 - 2021)



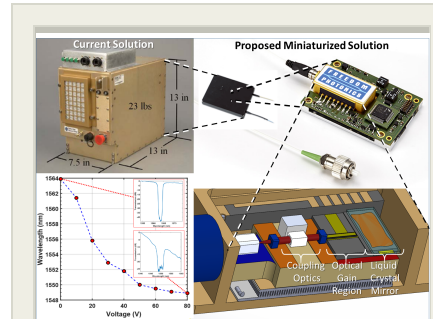
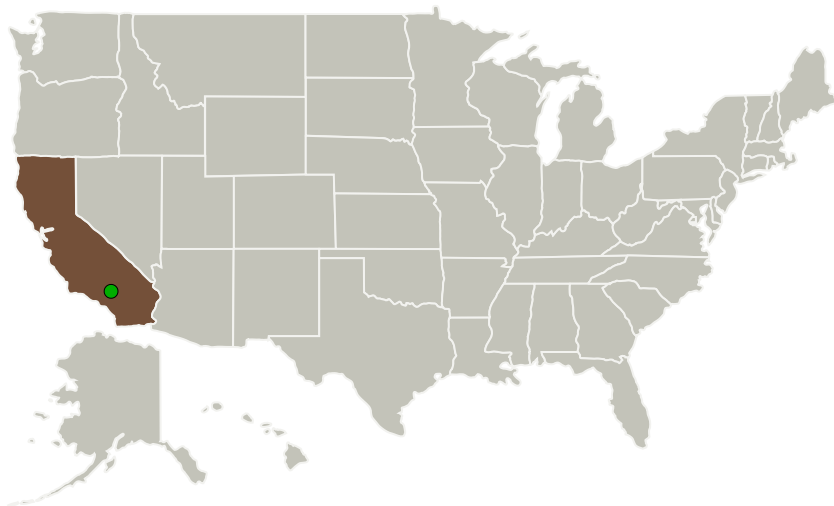
Project Introduction

Dryden (Armstrong) Flight Research Center has developed a 4-fiber interrogation system for Fiber Optic Smart Structures (FOSS) sensor networks interrogation. Replacing the expensive, bulky, mechanically tuned swept laser technology used in the FOS system will help reduce the system cost, size and weight, and enable massive deployment. In this program, Freedom Photonics proposes to develop a novel, inexpensive semiconductor based widely tunable laser, which can be tuned using simple tuning algorithms and control.

Anticipated Benefits

The applications for the FOS technology with NASA: stress and strain monitoring in air and space vehicles; temperature monitoring in air and space vehicles. Structural health monitoring in air and space vehicles. Liquid fuel level monitoring in rockets. Commercial applications include temperature and pressure monitoring for oil and gas drilling, monitoring the strain on blades of wind turbines, sensing liquid levels in vats of chemicals, monitoring temperature and strain along the wings or blades of aerial vehicles, and monitoring the interior and exterior structural strain of all sorts of structures, 3D shape sensing. Spectroscopy, instrumentation for spectroscopic measurements.

Primary U.S. Work Locations and Key Partners



Inexpensive, Rugged and Compact Tunable Laser with Simple Tuning Control for Airborne Fiber Optic Sensor (FOS) Interrogators, Phase II Briefing Chart Image

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| Organizations Performing Work | Role | Type | Location |
|--|-------------------------|-------------|---------------------------|
| Freedom Photonics, LLC | Lead Organization | Industry | Santa Barbara, California |
| ● Armstrong Flight Research Center(AFRC) | Supporting Organization | NASA Center | Edwards, California |

Primary U.S. Work Locations

California

Project Transitions

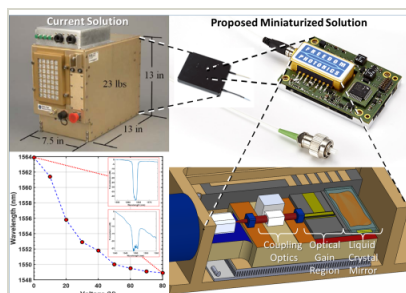
▶ **April 2017:** Project Start

✓ **April 2021:** Closed out

Closeout Documentation:

- Final Summary Chart PDF(<https://techport.nasa.gov/file/140906>)

Images



Briefing Chart Image

Inexpensive, Rugged and Compact Tunable Laser with Simple Tuning Control for Airborne Fiber Optic Sensor (FOS) Interrogators, Phase II Briefing Chart Image (<https://techport.nasa.gov/image/127928>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Freedom Photonics, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Project Managers:

Bruce R Cogan
Hon M Chan

Principal Investigator:

Gordon Morrison

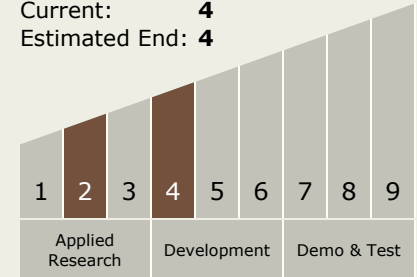
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Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System